Traveler Preference for Park & Ride Facilities: Empirical Evidence of Generalizability[1]

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Abstract. This paper reports the main findings of a study, conducted in the Netherlands, that aimed at testing whether preference functions for park and ride facilities, estimated from data collected in a specific Dutch region can be generalized to a nationwide sample. Preference data in both samples were collected using the method of hierarchical information integration. Contrast parameters were used to test the equality of a set of parameters for decision constructs that are assumed to influence the choice of park and ride facilities. Results suggest that the estimated preference functions for the two samples are largely the same within conventional statistical error bounds, providing empirical evidence of generalizability. In addition to the academic importance of this finding, it means for practitioners that no tailored-made research is required to assess the feasibility of such new park and ride facilities, especially if the results of this study would be further replicated in other contexts and regions.

Word count: 5059 + 8*250 = 7059

1 INTRODUCTION

Park and Ride facilities have been viewed as an answer to alleviating congestion in urban areas. An easy transfer should allow travelers to use their car in uncongested areas and transfer to public transport in urban, congested areas. Several such park and ride facilities have been built across the world. Their scope and attributes differ, and they also have experienced varying degrees of success. An interesting web site offering a general overview of Park & Ride facilities is http://www.vtpi.org/tdm/tdm27.htm.

The academic literature on the potential use of park and ride facilities has typically focused on a limited number of attributes [e.g. 1, 2, 3, 4, 5]. However, it has been realized that the use of park and ride facilities should not be viewed in terms of their characteristics only, but better as part of the full trip chain, or perhaps even in terms of a daily activity-travel pattern. This implies that the choice of park and ride facilities is a complex decision-making problem in the sense that a large number of factors potentially influence this choice. To measure preference for park and ride facilities, it therefore seems of critical importance to investigate how travelers trade-off a large number of potentially influential factors.

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In a previous study [6], the authors have applied the method of hierarchical information integration (an extension of conjoint or stated preference models) to identify the relative importance of a relatively large number of factors. Data were collected in the city of Nijmegen, The Netherlands, a city with a rather unique accessibility problem. Located along a river with only a few bridges, congestion problems are quite severe during peak hours. The analyses led to the identification of preference functions for the decision constructs *quality of Park and Ride facilities* and *quality of connecting public transport* that were found to influence the choice of park and ride facilities.

Having found these results, the question becomes whether the elicited preference functions primarily reflect the preferences of the Nijmegen sample only, which may have been formed against the background of the specific situation in this city, or can be seen as more fundamental underlying preference functions for the population at large and hence are generalisable. In this context, it should be emphasized that in some parts of the country, P&R facilities are operational with varying success. The aim of this sequel is to provide some empirical evidence related to this question. To that end, the experiment originally conducted in Nijmegen was repeated for a national Dutch sample. Preference functions were estimated for this national sample, and the resulting parameters, reflecting the utilities of attributes of park and ride facilities, were tested for equality between the two samples.

This paper reports the main finding of this study. First, we will discuss the data collection. Next, the findings of the estimation of the preference functions will be presented, followed by a formal statistical test of parameter equality. The paper is concluded by discussing some practical implications of the research findings.

2 DATA COLLECTION

2.1 Sample

The results about traveler preferences for park and ride facilities estimated for the region of Nijmegen were compared with the results of a national sample. The target group for this experiment are people who have a car available to travel to an urban area on a regular basis for work or recreational purposes. It should be emphasized that some of these people will (occasionally) use public transport, as illustrated in Table 1. The basic principle underlying respondent selection was that the destination of the traveler (a larger city) is located in a different municipality than the municipality of origin. We assumed that this creates a good condition for P&R use. Hence, the origin should not necessarily be a village but might also be another (big) city. Respondents were asked to indicate their most frequently visited city by car. They were requested to fill out the remaining of the questionnaire with this city in mind.

In order to determine the preferences for park and ride facilities for the region of Nijmegen, the required respondents were approached by interviewers in the center of Nijmegen in order to approach car drivers visiting Nijmegen for recreational purposes and by employers in the city of Nijmegen in order to approach car drivers visiting Nijmegen for working purposes. Potential respondents for the national sample were contacted through the Internet. Apart from the ease of approaching a large number of potential respondents, additional advantages of using Internet compared to paper and pencil questionnaires are that interim storage of data is possible and that data entry goes automatically. A disadvantage is that a selective response should be expected due to the fact that not everybody in the population has access to the Internet. To assess possible differences in this selective response, the response characteristics of the response group were compared with the characteristics of the response group of the data collection in Nijmegen.

To reach the target group, a link to the Internet page with the questionnaire was advertised on several sites frequently visited by car drivers, such as the site of the ANWB (the Dutch Automobile Association), a site where actual congestion is published, several sites where car drivers are able to plan the most efficient route from any place to another, and a site where one is able to trade second hand cars. In addition, in order to obtain a not too selected sample all municipalities in the Netherlands were asked to cooperate in establishing a link on their public Internet site. Ten municipalities agreed to participate. As a wide variety of Internet sites were selected, it is assumed that a heterogeneous response group would be obtained.

For the national sample, 1339 respondents noticed the link to the questionnaire on one of the web pages and started to fill out the questionnaire. From those respondents, 480 respondents filled out at least the SP task for the decision construct *quality of Park and Ride facilities*. In contrary, for the Nijmegen case, 805 respondents sent the questionnaire back of who 777 filled out at least the SP task for the decision construct *quality of P&R facility*.

2.2 Response characteristics

The response characteristics of the respondents having filled out at least the SP task for the decision construct *quality of Park and Ride facilities* are described in Table 1. Moreover, the same response characteristics are described for the Nijmegen case to enable comparing the personal characteristics for both data collections. The considered personal response characteristics are gender, age, education level, class of car, ownership of car and experience with public transport. In addition, the results of chi-tests are reported to determine whether response characteristics for the respondents from Nijmegen and from the Netherlands as a whole are significantly different. Moreover, chi-square tests were performed to determine whether response characteristics are significantly different between the respondents who completely have filled out the questionnaire and respondents who gave up halfway. As those tests resulted in only two significant differences, the response characteristics of the respondents who gave up halfway are not reported in the table but, where relevant, are discussed below.

From Table 1, it is observed that more men than women have filled out the questionnaire. This larger response from male respondents might be the result of the fact that the majority of car drivers, especially for longer distances, are male. Moreover, the more frequently use of the Internet by men might explain this result. This large group of male respondents has not been found for the case of Nijmegen. In Nijmegen, roughly as many men filled out the questionnaire as women. The distribution of male and female respondents for the two cases is significantly different.

In both cases, most respondents are between 30 and 50 years of age, but the younger and older groups are sufficiently represented as well. However, the response of the younger respondents on the questionnaire for the Netherlands is significantly larger as compared to Nijmegen. Again this might be explained by the use of the Internet. An additional conclusion that might be drawn when studying the non-response is that the non-response for the case of Nijmegen was significantly larger for the older respondents thus that they were in a larger degree tended to return the paper-questionnaire without filling out the questionnaire completely.

More highly educated people filled out the questionnaire than middle- or lower-educated people. This yields in a significantly larger degree for the respondents being approached over the whole country. This result might be explained when considering the fact that highly educated people have better access to the Internet than lower-educated people and that higher-educated people also are better able to fill out an Internet-questionnaire. The latter explanation might be supported by the fact that a significantly higher number of lower-educated people gave up filling out the Internet-questionnaire.

In both cases, most respondents have a (compact) middle class car, followed by a city car or compact class car and then a highly middle class or larger. However, significantly more respondents with a smaller car participated in the data collection for Nijmegen than for the Netherlands as a whole.

Almost all respondents have private cars. However, the percentage of respondents in the region of Nijmegen having a private car is significantly larger than the percentage of those respondents being approached over the whole country. The fact that a large number of respondents in the case of Nijmegen were approached by Philips Semiconductors, the university, the hospital and the municipality where lease cars are uncommon might explain this bias.

In both case studies, the majority of respondents have less experience with public transport. Nevertheless, additional analysis shows that a relatively larger number of respondents have experience with public transport in the national sample than for the case of Nijmegen. One should take this difference into account when comparing P&R preferences of respondents from Nijmegen with those of respondents over the whole Netherlands.

It might be concluded that all the response characteristics of the national sample are significantly different from those of the Nijmegen sample. These differences in response characteristics might explain possible differences, if any, in the preference models for the two cases.

2.3 Response distribution over the country

In addition, the response distribution over the country is visualized for both cases. Figure 1 shows the response distribution for Nijmegen. The several grey values, corresponding with the legend, give an indication for the number of respondents living in a certain zip code area. Figure 1 clearly shows that the origins of respondents for the case of Nijmegen are concentrated in the region around the city of Nijmegen. However, as visible, some respondents visited Nijmegen living further away from the city.

Figure 2 shows the response distribution for the Netherlands as a whole. Also in this figure, the several grey values give an indication for the number of respondents living in a certain zip code area. For the case of the whole Netherlands it is obvious that the origins of the respondents are more equally distributed over the whole country with a concentration in the Randstad. This is not a surprising result when considering that the population density is very large in this area.

Thus, it might be concluded that the response distribution over the country is different for the two cases. These differences in response distribution might also explain possible differences in preferences of respondents.

2.4 Travel pattern characteristics

Finally, both for the case of the Netherlands and for the case of Nijmegen the travel patterns of the respondents having filled out at least the SP task for the decision construct *quality of Park and Ride facilities* are described in Table 2. Also for this case, no results are described for the respondents who started to fill out the questionnaire as chi-square tests between the respondents who filled out the questionnaire completely and the respondents who gave up halfway reveal no significant differences. Moreover, by using independent-sample t-tests it is tested whether the results are different for the Netherlands and for Nijmegen.

Table 2 shows some differences when comparing the travel patterns for the case of the Netherlands with those for the case of Nijmegen. In general, the travel time of car drivers in the Netherlands is significantly larger to their most visited city than the travel time of car drivers in the region of Nijmegen to the city Nijmegen. However, car drivers in the Netherlands encounter roughly the same delays when they get into a traffic jam as car drivers in the region of Nijmegen.

With respect to the current public transport alternative of car drivers, the frequency of the current public transport alternative for car drivers in the whole Netherlands is not significantly different of the frequency of the current public transport alternative for car drivers in the region of Nijmegen. Further, car drivers in the whole Netherlands have significantly more transfers in their current public transport alternative than the car drivers in the region of Nijmegen. However, the average waiting time for car drivers' current public transport alternative is equal for the whole Netherlands as for the region of Nijmegen. Moreover, car drivers in the Netherlands on average have a significantly higher travel time by their current public transport alternative than car drivers in the region of Nijmegen, probably due to on average a longer travel distance (more intercity trips). The same yields for the difference between the travel time by the current public transport alternative and by the car alternative as well without and with delays, which is larger for car drivers in the Netherlands. Finally, car drivers in the Netherlands are significantly less satisfied with their public transport alternative than car drivers in the region of Nijmegen.

It might be concluded that the lower number of required transfers in the current door-to-door public transport alternative for car drivers in the region of Nijmegen and the higher satisfaction with the current door-to-door public transport alternative might explain some differences in preferences concerning P&R facilities.

2.5. Experimental tasks

Preferences for park and ride facilities were measured using the method of hierarchical information integration, a variant of conjoint analysis (stated preference) for complex decisions problems, involving a large number of attributes. In case of a large number of attributes, a respondent's task would be too demanding because the number of profiles would become quite large. In addition, respondents would have to process a considerable amount of information, describing the variation in attribute profiles. Consequently, the reliability of provided responses might be at stake. To reduce respondent burden, the HII approach assume that individuals, when faced with such complex decisions, first organize the attributes into a set of higher order decision constructs and then trade-off these preferences for higher order constructs to arrive at an overall preference or choice.

The experimental design approach, underlying HII, strictly follows these assumptions (see Figure 3). That is, attributes are first classified into higher order decision constructs. Next, for each decision construct, a fractional factorial design is created varying the attribute levels belonging to this decision constructs. Finally, a bridging experiment is designed to collect data about the integration of the evaluation of the decision constructs into an overall preference or choice.

Figure 4 implies that three experiments were constructed based on the results of a pilot study [7]. One experiment to estimate the contribution of the underlying attributes to the 'P&R facilities' decision construct, another experiment for estimating the influence of attributes on the 'public transport' construct, and the bridging experiment.

The design of these experiments involved combining the underlying attribute levels into profiles. In order to limit the number of profiles, the 'smallest orthogonal fraction' of the full factorial design was chosen for each experiment. This operational decision implied that none of the interaction effects could be estimated. Thus, it was assumed that the part-worth utilities of the attribute levels defining a particular decision construct are added to obtain the overall preference for that decision construct. This decision resulted in 18 profiles for the P&R facility experiment and 9 profiles for the public transport experiment. Respondents were asked to evaluate each profile on a ten-point rating scale, ranging from very unattractive (1) to very attractive (10).

In addition to the two construct experiments, a bridging experiment was constructed. However, as the design of the bridging experiment differed for the two cases and on the other hand the two construct experiments were conducted in exactly the same way for both cases, the focus of the present study is on the preferences for the decision constructs. For this reason, we will not discuss the design of this bridging experiment in any detail.

3 ANALYSES AND RESULTS

The aim of the analysis was to test whether the estimated parameters, reflecting part-worth utilities for the attributes varied in the experiment differ between the Nijmegen sample and the national sample. These tests were conducted for each of the two decision constructs separately. Results will be discussed in the following two sections in turn.

3.1 Quality of Park and Ride facilities

In this subsection, the differences are described between the estimation results of both the model for the whole Netherlands and the model for Nijmegen that describes the rating of the quality of P&R facilities as a function of a set of attributes characterizing this quality. A comparison between those two models is permitted as the models for both decision constructs were designed in a similar way. A main-effects only model was estimated using linear regression analysis and effect coding was used to represent the attribute levels. Further, also here the models are based on aggregation of individual data.

The results are presented in Table 3, which presents the part-worth utilities of the attribute levels and the significance levels for the model for the whole Netherlands and for the model for Nijmegen. Moreover, the differences between the part-worth utilities for both models including their significance levels are presented, calculated by adding contrast parameters in the analysis. Finally, the R^2 is considered as a measure of the goodness-of-fit of the model.

First, the order of attribute importances for the two measurements is compared. From the ranges presented in Table 3 it appears that the order of importance is very consistent, with the exception of the pedestrian route, which is more important in the Nijmegen model. To find out whether this different result influences the overall degree of similarity between the two models, Spearman correlation is calculated expressing the degree of similarity in the order of attribute importances. The Spearman correlation was 0.86 with a significance level of 0.01, implying that the correlation between the order of attribute importances for the two measurements is significantly different from zero. Thus, it might be concluded that the generalizability of the model results with respect to the order of importances of the considered attributes is high.

Comparing the estimated parameters of the two models, the overall utility is somewhat larger for the Netherlands than for Nijmegen. In other words, car drivers in Nijmegen derive on average less utility from a P&R facility than car drivers in the Netherlands. This observation is confirmed by a significant contrast parameter, which expresses the difference between the overall utility estimated after pooling the data for the two cases and the overall utility for the case of Nijmegen. The part-worth utilities derived for the included attributes point out that, in general, respondents in the whole Netherlands experience less utility from the attributes describing the safety of the P&R facility then the respondents in the region of Nijmegen. This result might be explained by the fact that car drivers in the Netherlands on average have significantly more experience with public transport in general and thus experienced that the chance having trouble when transferring is very small.

Further, two other significant differences appear. Firstly, in the general model, the difference in utility between an unheated and a heated waiting room is smaller than for the model of Nijmegen. Secondly, paying machines are more preferred by respondents in the Netherlands than by respondents in the region of Nijmegen. The opposite is true for electronic payment with a chip card. Respondents in the region of Nijmegen might be more used paying with a chip card, as they had to pay with a chip card for parking in the city center during the fieldwork, a relatively exceptional situation within the Netherlands at the time of data collection

Finally, the R^2s of the two models, which indicate the predictive power of the models for individual preferences, appear relatively low. However, one should realize that the models are based on individual level data, and hence these values reflect considerable heterogeneity between respondents.

Overall, it might be concluded that the preferences for attributes in the decision construct *quality of P&R facility* are roughly equal for the car drivers in the region of Nijmegen and for the car drivers being approached across the whole country. The estimated contrast parameters only show a difference for the attributes describing safety at the P&R facility, the availability of a heated waiting room and the availability of paying facilities. However, these differences are rather small.

3.2 Quality of connecting public transport

In this section, the differences are described between the estimated model for the whole Netherlands and the model for Nijmegen with respect to the rating of the quality of connecting public transport services. These models were also estimated as a function of a set of attributes that are assumed to adequately define such quality.

The results are presented in Table 4, which shows the part-worth utilities of the attribute levels and the significance levels for the model for the case of the Netherlands as a whole and for the model for the case of Nijmegen. The differences between the part-worth utilities for both models with their significance levels and the R^2s of both models are also given.

Table 4 shows that the order of importance of attributes is highly consistent, with the exception of the number of transfers. In the model for the Netherlands, the number of transfers and the frequency of the connecting public transport are of equal importance while according to the model for Nijmegen, the number of transfers is substantially more important than the frequency. An explanation for this effect might be that car drivers in Nijmegen are less familiar with transferring between different public transport modes. To find out whether this different result influences the overall similarity of the two models, again the Spearman correlation coefficient was calculated. The Spearman correlation is 0.80 with a significance level of 0.20, implying that the correlation between the order of attribute importances for the two measurements is not significantly different from zero. An explanation of this high, but not significant Spearman’s correlation coefficient is the limited number of attributes included in the model resulting in a low number of degrees of freedom.

Comparing the estimated parameters of the two models, the average utility is significantly larger for Nijmegen than for the Netherlands. However, looking at the values of the intercepts, this difference is very small. Looking at the estimated part-worth utilities, only one significant parameter was estimated for the attribute *number of transfers*. As suggested earlier, due to the significant lower number of transfers in the current door-to-door public transport for car drivers in the region of Nijmegen, they might be less familiar with transferring resulting in a higher resistance against transferring at a P&R facility.

It might be concluded that the differences between the estimated models for the decision construct *quality of connecting public transport* are small. Only the number of transfers that one has to make in the connecting public transport seems to be more important for the car drivers in Nijmegen than for the car drivers approached across the whole country.

4 CONCLUSIONS AND DISCUSSION

This paper has reported the results of a study of generalizability of traveler preferences for attributes influencing the choice of Park and Ride facilities. Preferences or part-worth utility functions for a set of attributes, estimated on data collected through the method of hierarchical information integration were compared and tested for equality between a sample in the city of Nijmegen and a Dutch national sample. The results of these statistical tests indicated that differences between the two samples are small, regardless of differences in socio-demographic composition and spatial differences. This suggests the existence of a considerable degree of consistency in the way travelers have formed their preferences for Park and Ride facilities. This is an interesting theoretical result in the sense that it provides some empirical evidence of generalizability. It should be noted, however, that similar preferences do not rule out differences in use, as the relationship between preference and use may vary by socio-demographics. Hence, future research should address this issue to better understand the preferences of market segments that are more amenable to using park and ride lots. In addition, a more detailed analysis of possibly varying preferences of different markets is important because our conclusions in this paper are built on aggregate results.

Nevertheless, if our findings would be replicated in other studies, the results of this study also have some immediate relevance for applied transportation planning practice. In practice, professionals often have to assess the feasibility of new park and ride facilities or assess the relative importance of various design attributes. The debate in such situations often focuses on the question whether such decisions could be based on general findings in the literature, or whether tailored-made additional research is required in the city of interest. Evidently, designing and implementing a new study is the most expensive solution. This study has provided some evidence that preferences for park and ride facilities can be generalized (at least within a single, small country with no extreme variation in spatial, urban or traffic conditions) and hence that tailored-made additional research into the feasibility of new park and ride facilities, involving original data collection, may not be required unless one has reason to believe that the situation in that region differs fundamentally. In addition, practitioners can use the set of estimated parameters to assess the degree of mismatch between their (planned) park and ride facilities and average consumer preference. An illustration of how this model can be used to predict the demand for Park & Ride facilities at a particular location, and how well it can identify strategies for increasing Park & Ride use is provided in another, parallel paper [8].

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List of tables and figures

Table 1. Personal response characteristics

	Netherlands N=480	Nijmegen N=777	Sign
1 Gender			**0.00**
Male	70.6	55.8	
Female	29.4	44.2	
2 Age			**0.00**
18-30	29.6	20.0	
31-50	53.0	58.4	
51+	17.4	21.6	
3 Education level			**0.02**
Bachelor’s / master’s degree	36.9	43.9	
Lower or intermediate education	63.1	56.1	
4 Class of car			**0.00**
City car / Compact class	25.1	31.8	
Compact middle class / Middle class	55.2	55.8	
Highly middle class / Top class / Others	19.7	12.4	
5 Ownership of car			**0.00**
Private car	82.9	92.0	
Lease car	17.1	8.0	
6 Experience public transport			**0.01**
More than once a month	14.8	17.4	
Once a month until once a year	29.7	53.7	
Less than once a year	55.5	28.9	

Table 2. Travel pattern characteristics

	Netherlands N=480		Nijmegen N=777		
	Mean	SD	Mean	SD	Sign
Travel time without delays (in min)	35.0	26.4	27.0	19.8	0.00
Additional travel time due to delays (in min)	17.2	18.4	17.6	12.6	0.68
Frequency current PT alternative (departures per hour)	2.3	1.7	2.1	1.9	0.05
Number of transfers in current PT	1.3	1.3	0.8	1.1	0.00
Total waiting time for current PT (in min)	11.7	10.9	12.7	8.3	0.19
Travel time by current PT (in min)	66.9	47.8	50.2	37.1	0.00
Travel time PT minus travel time by car without delays (in min)	31.1	33.4	23.6	26.1	0.00
Travel time PT minus travel time by car with delays (in min)	13.2	36.3	6.9	28.8	0.01
Satisfaction current PT (scale 1-10)	4.1	2.6	4.6	2.6	0.01

PT = public transport

Table 3. Comparison of two models with respect to quality of P&R facilities

	Netherlands N=480			Nijmegen N=777			Contrast.	
	P-w utility	Sign.	Range	P-w utility	Sign.	Range	Value	Sign.
Average utility (intercept)	5.22	0.00		4.99	0.00		-0.11	0.00
1 Supervision			**1.02**			**1.29**		
No supervision	-0.61	0.00	(1)	-0.75	0.00	(1)	-0.07	0.00
Cameras	0.19	0.00		0.21	0.00		0.01	0.64
Cameras and supervisors	0.41			0.54				
2 Maintenance			**0.92**			**1.05**		
Clean, good state of repair	0.61	0.00	(2)	0.66	0.00	(2)	0.02	0.19
Holes in asphalt	-0.31	0.00		-0.27	0.00		0.02	0.29
Graffiti and holes in asphalt	-0.31			-0.39				
3 Pedestrian route car - PT			**0.59**			**0.93**		
Obscure and deserted	-0.29	0.00	(5)	-0.48	0.00	(3)	-0.10	0.00
Surveyable but deserted	-0.02	0.57		0.03	0.23		0.02	0.23
Surveyable and lively	0.30			0.45				
4 Additional provisions			**0.73**			**0.67**		
No additional provisions	-0.33	0.00	(4)	-0.32	0.00	(4)	0.01	0.63
Kiosk	-0.06	0.03		-0.04	0.10		0.01	0.46
Supermarket	0.40			0.35				
5 Walking time car - PT			**0.75**			**0.66**		
1 min	0.31	0.00	(3)	0.28	0.00	(5)	-0.01	0.44
3 min	0.13	0.00		0.10	0.00		-0.02	0.30
5 min	-0.44			-0.38				
6 Waiting room			**0.53**			**0.64**		
No waiting room	-0.32	0.00	(6)	-0.33	0.00	(6)	-0.01	0.76
Covered but unheated	0.11	0.00		0.03	0.23		-0.04	0.02
Covered and heated	0.21			0.31				
7 Paying facilities			**0.38**			**0.22**		
Paying machine	0.20	0.00	(7)	0.11	0.00	(7)	-0.04	0.02
Manned ticket service	-0.01	0.67		0.00	0.91		0.00	0.80
Electronic with a chip card	-0.18			-0.11				
R^2	0.17			0.20				

Table 4. Comparison of two models with respect to quality of connecting public transport

	Netherlands N=414			Nijmegen N=743			Contrast	
	P-w utility	Sign.	Range	P-w utility	Sign.	Range	Value	Sign.
Average utility (intercept)	5.29	0.00		5.37	0.00		0.04	0.05
1 Certainty of seat			**2.11**			**1.99**		
5% chance	-1.07	0.00	(1)	-1.05	0.00	(1)	0.01	0.62
50% chance	0.04	0.38		0.11	0.00		0.04	0.20
95% chance	1.04			0.94				
2 Number of transfers			**0.90**			**1.56**		
0 transfers	0.40	0.00	(3)	0.78	0.00	(2)	0.19	0.00
1 guaranteed transfer	0.10	0.02		0.00	0.93		-0.05	0.07
1 not guaranteed transfer	-0.50			-0.78				
3 Frequency of PT			**0.92**			**0.97**		
Once in 5 min	0.41	0.00	(2)	0.43	0.00	(3)	0.01	0.70
Once in 10 min	0.10	0.03		0.12	0.00		0.01	0.78
Once in 15 min	-0.51			-0.54				
4 PT Mode			**0.36**			**0.17**		
Metro / Train	0.13	0.00	(4)	0.04	0.22	(4)	-0.04	0.11
Tram	0.10	0.03		0.09	0.01		0.00	0.90
Bus	-0.23			-0.13				
R^2	0.22			0.25			0.24	

Figure 1. Response distribution for the data collection Nijmegen

Figure 2. Response distribution for the data collection Netherlands

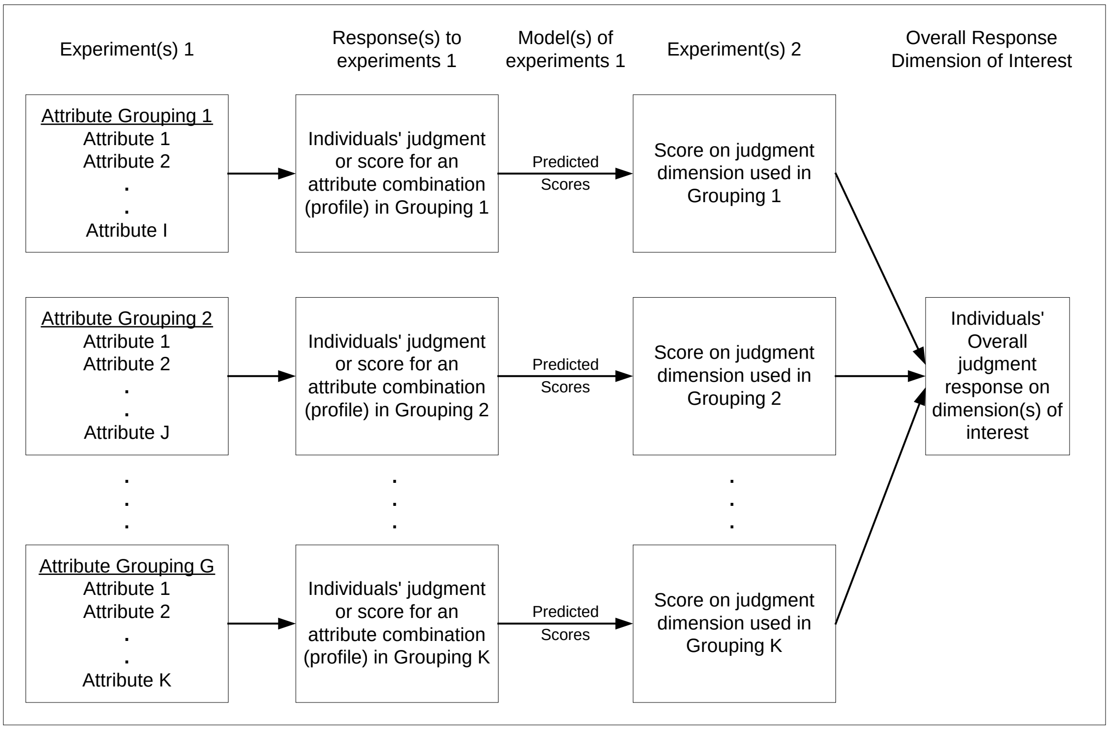

Figure 3. Flowchart of proposed hierarchical judgment process (Source: Louviere, 1984)

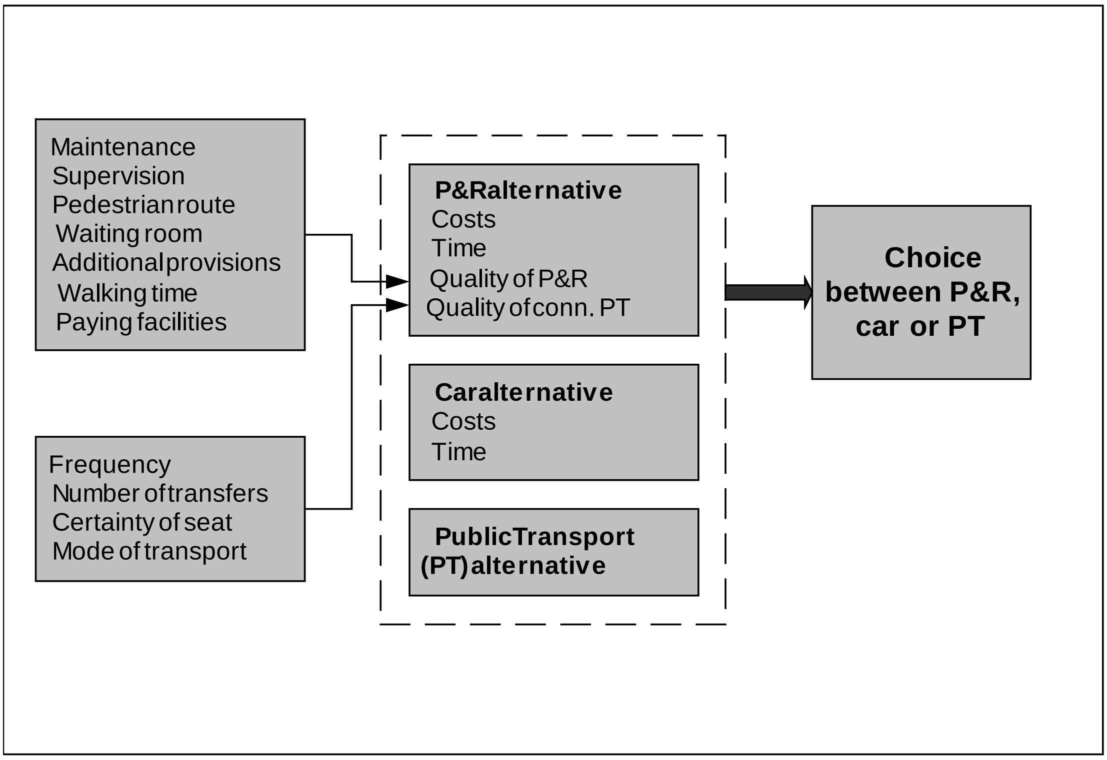

Figure 4. Structure of HII experiment